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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In re application of: Peter C. Van Buskirk, et al.

Title : ISOTROPIC DRY CLEANING PROCESS FOR NOBLE METAL  
INTEGRATED CIRCUIT STRUCTURES

U.S. Serial No.: New Continuation of Prior Copending U.S. Patent Application No.  
09/093,291

Prior Application Filing Date: June 8, 1998

Prior Application Group Art Unit: 1746

Prior Application Examiner: A. Olsen

Customer No.: 25559

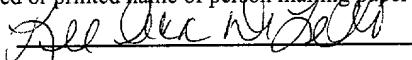
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Assistant Commissioner for Patents  
Washington, D.C.20231

PRELIMINARY AMENDMENT

Sir:

Prior to examining the instant application on the merits, please amend the  
specification as follows:

IN THE SPECIFICATION

Please amend the specification by inserting before the first line the sentence --This is a continuation of U.S. Application No. 09/093,291, filed on June 8, 1998, now pending.--

IN THE CLAIMS

Please cancel claims 1, 5-11, 15-22, 28-51.

Please add the following new claims:

48. A method for removing a noble metal residue comprising iridium, from a microelectronic device structure disposed in a chamber, the method comprising contacting the microelectronic device structure with a cleaning gas comprising gas-phase  $\text{XeF}_2$ , wherein the gas phase  $\text{XeF}_2$  is continually flowed through the chamber in combination with an energetic dissociation source selected from the group consisting of a plasma source, an ion source, an ultra violet source and a laser source, to at least partially remove the noble metal residue.
49. A method for removing a noble metal residue comprising iridium, from a microelectronic device structure disposed in a chamber, wherein elemental silicon is present, the method comprising evacuating the chamber, filling the chamber with a cleaning gas comprising  $\text{XeF}_2$ , and retaining the cleaning gas in the chamber to react with the residue, to effect the removal of the noble metal residue from the microelectronic device structure.
50. A method for removing a noble metal residue comprising iridium, from a microelectronic device structure disposed in a chamber, the method comprising

evacuating the chamber, filling the chamber with a cleaning gas comprising XeF<sub>2</sub> and one or more radicals selected from the group consisting of SiF<sub>2</sub> and SiF<sub>3</sub>, and retaining the cleaning gas in the chamber to react with the residue, to effect the removal of the noble metal residue from the microelectronic device structure.

51. A method for removing from a microelectronic device structure a noble metal residue including at least one metal selected from the group consisting of platinum, palladium, iridium and rhodium, the method comprising contacting the microelectronic device structure with a gas-phase reactive halide composition comprising SiF<sub>4</sub>, to remove the residue.
52. A method for removing from a microelectronic device structure a noble metal residue including at least one metal selected from the group consisting of platinum, palladium, iridium and rhodium, the method comprising contacting the microelectronic device structure with a gas-phase reactive halide composition comprising Si<sub>2</sub>F<sub>6</sub>, to remove the residue.
53. A method for removing from a microelectronic device structure a noble metal residue including at least one metal selected from the group consisting of platinum, palladium, iridium and rhodium, the method comprising contacting the microelectronic device structure with a gas-phase reactive halide composition:
  - (a) comprising a halide component selected from the group consisting of SF<sub>6</sub>, SiF<sub>4</sub>, Si<sub>2</sub>F<sub>6</sub>, SiF<sub>2</sub> radical, SiF<sub>3</sub> radical, and XeF<sub>2</sub>, in an amount effective to at least partially remove the residue; and

(b) lacking a nitrogen- or phosphorous-containing  $\pi$ -acceptor ligand.

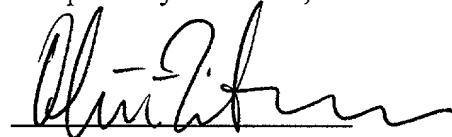
REMARKS

This is a continuation of application serial no. 09/093,291, now allowed.

An early examination on the merits is earnestly solicited.

Date: January 24, 2001

Respectfully submitted,



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